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UTAH'S

AEROSPACE INDUSTRY

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State economic development leaders have chosen to concentrate economic development efforts and resources on those industries for which Utah has a competitive advantage. The aerospace industry has been identified and targeted as one such industry. In September 1988 Governor Bangerter formed the Aerospace Task Force to develop an "action plan to strengthen and expand the aerospace industry in Utah."[2]

An understanding of the structure and long-term performance of Utah's aerospace industry was the first step in developing an action plan for increasing the state's aerospace employment. Therefore, the Department of Community and Economic Development requested the Bureau of Economic and Business Research to provide the state with research and current data on the locational advantages of Utah for the aerospace industry and its suppliers. The study includes a discussion of the structure of the industry in the state, the major firms, and their employment characteristics. Such information provides a useful frame-of-reference to evaluate Utah's potential for attracting new aerospace industry and increasing aerospace-related employment. This article presents a summary of that study.

Structure and Historical Development

Utah's aerospace industry is organized into four primary sectors: (1) Missile and Space Programs; (2) Military Aircraft; (3) Commercial Aircraft; and (4) Related Products and Services. These four sectors are reviewed as to their activity, employment, production and future commitments.

Missile and Space Programs

The structure of Utah's aerospace industry is characterized by its employment concentration in Missile and Space Programs. Employment in this sector totals 14,010 aerospace workers or 70.2 percent of the aerospace employment in the state. During the 1980s employment

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[2]Aerospace Development Action Plan, Department of Community and Economic Development, State of Utah, September 1989.

at Thiokol and Hercules increased substantially. The combined employment for these two major Utah aerospace companies in 1980 was 7,100; Thiokol with 4,500 employees and Hercules with 2,600. The combined employment increased to 12,650 by 1989; Thiokol with 8,150 employees and Hercules with 4,500. The increase of 5,550 employees reflects the role these two companies have played in the recent development and production of propulsion systems and filament winding for the Peacekeeper (MX), Midgetman and Trident missiles, the Space Shuttle program and U.S. Air Force launch vehicles systems.

Although the 1980s have been a decade of rapid employment growth for the missile and space sector in Utah, the sector's beginning goes back to the late 1950s when Hercules Bacchus Works and Thiokol first began developing propulsion systems. The chronological development of Utah's aerospace industry is illustrated in Chart 1. The chart displays the gradual 30-year development of the state's aerospace industry and illustrates the early start of the missile and space sector in Utah.

The Missile Programs

During the 1980s Utah benefitted from increased military demand for missiles which pushed the annual procurement for engines and propulsion units by the Department of Defense (DOD) from $661 million in 1980 to $1.6 billion by 1987. In constant 1982 dollars the compound annual growth rate for engines and propulsion units was an impressive 7.6 percent. The major firms comprising this sector are Thiokol, Hercules, Williams International, TRW, Teleflex, Boeing, Rockwell Collins, Lockheed, Globesat and Intraspace. The two largest of these companies, Thiokol and Hercules, account for over 63 percent of the total aerospace employment in Utah.

Minuteman and Peacekeeper (MX) -- These two missile programs of the U.S. Air Force have played an important role in Utah's aerospace industry. The beginning of aerospace employment in Utah can be traced to the selection in the late 1950s of Hill Air Force Base as the system's manager for the Minuteman Missile, a surface-to-surface missile (ICBM), with a range of over 7,000 miles. Shortly thereafter, the U.S. Air Force selected Thiokol as the manufacturer of the propulsion system for the Minuteman. At that time, Thiokol had a small Utah operation which was expanded rapidly to meet production schedules. Hercules also participated in the production of the propulsion system; and by the early 1960s Boeing and TRW were awarded subcontracts with the Air Force for Minuteman Missile maintenance. Minuteman Missiles are no longer in production.

Thiokol, Hercules, Boeing and TRW are all now participating in the production and operation of the

Chart 1
Year of Location of Aerospace Firms
in Utah and 1988 Employment

Source: Bureau of Economic and Business Research and interviews with firms 1988-89. Firms with 100 or more employees.

* Projected Total.
b Purchased from Utah Research and Development by Acme in 1987.

USAF Peacekeeper Missile (MX), an advanced system replacing the Minuteman. Hercules is producing the third-stage motor; Thiokol is producing the first-stage motor. Like the Minuteman, the Peacekeeper is a surface-to-surface missile with a range of over 7,000 miles.

Missile Program's Future -- The future of the MX Missile program is currently being debated. The Reagan Administration and the Air Force endorsed the placing of MX missiles on railroad cars--the rail-garrison basing mode. This system is opposed by some members of the Bush Administration in favor of placing small ICBMs (Midgetman Missile) in the southwestern United States. Probably the best case for Utah's aerospace industry would be some mix of both Peacekeeper and Midgetman since both Hercules and Thiokol are also involved in development of the Midgetman Missile. Hercules is developing the third-stage motor, laser ordinance system, stage separator and ignition system. Thiokol is developing the first-stage motor.

The Air Force had planned to procure 12 MX Missiles in fiscal year 1990 and 12 more in 1991. The cost of this procurement would be approximately $800 million each year. However, congressional support for the Midgetman and the Peacekeeper missile programs has eroded with the easing of east-west military tensions and mounting concern over the federal deficit. Both missile programs are presently vulnerable to substantial funding cuts.

Trident II -- Another strategic missile important to Utah's aerospace industry is the Trident II. Both Hercules and Thiokol are participating in the manufacture of the propulsion systems for the Trident II, which has widespread funding support and seems assured of its portion of the modernization program underway for the strategic triad (air, land and sea). Thiokol is producing second-stage Trident II motors and with Hercules is also producing first-stage motors. The Navy plans to acquire 63 Trident II Missiles in fiscal 1990 and 52 the following year. The procurement plan for the Trident II would be approximately $2 billion each year, making the Trident II by far the largest Department of Defense missile program. The Trident II has a range of over 4,000 miles.

Beyond the strategic missile programs for the Air Force and Navy, Utah's Thiokol, Hercules and Williams International are also propulsion manufacturers for a number of other DOD missile programs. Teleflex also produces missile launch systems for two DOD missile systems. These systems are outlined below:

	Agency	Phase	Company
Air-to-Air			
AMRAAM	Air Force/Navy	Develoment	Teleflex
Air-to-Surface			
HARM	Navy/Air Force	Production	Thiokol
ALCM	Air Force	Production	Williams
Surface-to-Air			
STANDARD	Navy	Production	Thiokol
Battlefield Support and Antiarmor			
Tow 1, 2, 2A	Army	Production	Teleflex

Besides these missile programs the Navy's Poseidon Missile was an important program for Thiokol for several years. The Poseidon is no longer in production. It should be noted that both Thiokol and Hercules have also been the leaders in winding filament technology for missile launch canisters of strategic missile systems.

The Space Programs

Both Thiokol and Hercules have been leading suppliers of solid rocket propulsion systems for space applications since the late 1950s. Consequently, aerospace employment in Utah has been closely linked with NASA and USAF space programs. The centerpiece has been the NASA Space Shuttle program for which Thiokol has produced the recoverable and reusable solid booster motors.

The Space Shuttle has been the largest single NASA program in the 1980s. Since 1984 the outlays by NASA for Space Shuttle Flight Control and Data Communications has increased from $2.9 billion to $5.1 billion in 1989. In constant 1982 dollars the outlays have increased at a high compound rate of 8.2 percent.

The propulsion systems are an important element of the Space Flight Control outlays; however, the expenditures on propulsion systems have been relatively erratic in the past few years due to the Challenger accident. The last four years of expenditures for propulsion systems for the Space Shuttle are: 1986, $789 million; 1987, $464 million; 1988, $595 million; and 1989, $712 million. Although the level of expenditures has been somewhat volatile, the propulsion system outlays, nevertheless, represent a relatively large program that has led to increased employment in the 1980s for Thiokol and Utah's aerospace industry.

Hercules has participated in the Space Shuttle program with the design and production of a carbon composite rocket motor booster case. The booster case, made of the exceptionally strong and lightweight carbon fibers produced by Hercules, has a significant weight and strength advantage over metal counterparts. Hercules carbon composites are 40 percent lighter than aluminum and stronger than high-strength steels.

In addition to the Space Shuttle program, Utah's aerospace industry plays an important role in the production of propulsion systems for Air Force launch vehicles. Hercules will be producing the propulsion systems for the Delta II medium launch vehicle as well

as for the large Titan IV, an expendable-launch vehicle. Hercules has also undertaken a private satellite launch venture in their Pegasus program. This program has significant potential for small payload commercial satellites because of the low cost for an airborne launch. The satellite launch actually takes place from a mother aircraft (B-52).

The Utah aerospace companies identified by their products and services for the missile and space sector are given below:

Missile and Space Programs

Trident II, Peacekeeper (MX), Midgetman Missile propulsion units
Thiokol and Hercules

Minuteman and Peacekeeper Missile maintenance
TRW, Boeing, Rockwell and Lockheed

Propulsion units for tactical missiles
Thiokol and Hercules

Missile launch systems for tactical missiles
Teleflex

Filament winding and composite structures for missiles and space vehicles
Thiokol and Hercules

Jet engines for Cruise Missile
Williams International

Space Shuttle solid booster rocket motor
Thiokol

Delta II medium launch vehicle propulsion unit
Hercules

Titan IV expendable-launch vehicle solid propulsion unit
Hercules

Total Employment: 14,010
70.2 percent of Utah's total aerospace employment

Military Aircraft

In contrast to the national aerospace industry, the military aircraft sector in Utah is relatively small. Military aircraft is the largest sector in the national aerospace industry. In 1987 military aircraft accounted for $44.8 billion in sales or 40 percent of all sales in the aerospace industry. The sheer size of this sector is illustrated by a comparison to the Utah economy. In 1987 the Gross State Product of Utah was approximately $26 billion, equal to about 60 percent of the military aircraft sector nationally.

Unisys, Litton and E-Systems, three of the largest companies in Utah's military aircraft sector, located in Utah in the late 1950s. Since then the internal growth and location of new firms has been relatively slow. The pattern of growth shows that about every ten years there is another burst of activity in Utah's military aircraft sector. Ten years after Unisys, Litton and E-Systems located in Utah, Williams International and Flameco were started. Another ten years passed before Parker Hannifin, Teleflex and Rockwell Collins came to the state. And now ten years later SPS Technologies and Lucas Western have located in Utah (Chart 1).

Utah's aerospace sector has no military aircraft manufacturing activity. This sector is comprised entirely of subcontracting companies. The largest operation, with nearly 50 percent of the employment in this sector, is the Unisys Defense Systems Division. Unisys is engaged in classified production of communication systems for the military which includes surface-to-air, surface-to-surface and microwave communications.

Communications and navigation systems comprise the majority of the manufacturing activity of the military aircraft sector, although there are a number of companies producing a fairly wide variety of products. Utah's aerospace industry does not benefit from any single military aircraft program. It should be acknowledged at this point that the major role of Hill Air Force Base and the F-16 aircraft have not been overlooked, but these activities fall outside the scope of this study.

The Utah aerospace companies identified by their products or services for the military aircraft sector are given below:

Military Aircraft

Communication systems
Unisys Defense Systems Division

Hydraulic flight equipment
E-Systems, Parker Hannifin, and Lucas Western

Titanium, carbide screws
SPS Technologies

Inertial navigation systems and navigation aids
Litton and E-Systems

Ground-based navigation systems
E-Systems

Power conversion systems
Acme Utah Research and Development

Inventory function and jet aircraft radio assembly
Rockwell-Collins

Small gas turbine engines for target drone
Williams International

Printed circuit boards
Westronix

Fabrication of titanium parts for aircraft
Flameco

Total Employment: 3,596
17.7 percent of Utah's total aerospace employment

Commercial Aircraft

This sector has recently experienced a surge of activity with the Utah locations of McDonnell Douglas, SPS Technologies, Westronix and Lucas Western. The projected Utah employment for McDonnell Douglas — 1,000 to 1,500 employees—will add significantly to this sector. Presently, commercial aircraft activity accounts for fewer than 1,000 aerospace employees or only 5.6 percent of total aerospace employment in the state. Many of the companies in this sector manufacture for both military and commercial aircraft. Nationally, the commercial aircraft sector is growing rapidly with over $15.5 billion in sales accounting for 14 percent of total sales activity of the aerospace industry.

Utah's aerospace companies in the commercial aircraft sector are identified by product in the list below:

Commercial Aircraft Production

Subassembly for floor and sill frame for MD-80 and MD-11
McDonnell Douglas

Geared products and hydraulics
Lucas Western, Parker Hannifin

Titanium, carbide screws
SPS Technologies

Titanium fabrication
Flameco

Ground-based navigation aids and power systems
E-Systems, Acme Utah Research and Development

Inventory function and assembly of jet aircraft radio
Rockwell Collins

Printed circuit boards
Westronix

Total Employment: 1,162
5.6 percent of Utah's total aerospace employment

Related Products and Services

There are only two firms in this sector, Evans & Sutherland and Abex Jetway. Both firms are "home-grown" companies, although Jetway is now a subsidiary of PA Holdings Corporation. Jetway is a leading producer of boarding bridges for commercial airlines and was begun in 1958. Evans & Sutherland is a pioneer in flight training simulation systems for commercial and military use. The employment figures used for Evans & Sutherland exclude employment in the company's computer division.

Related Products and Services

Boarding bridges
Abex Jetway

Flight simulation systems
Evans & Sutherland

Total Employment: 1,300
6.5 percent of total aerospace employment in Utah

Employment Characteristics and Future Growth of Utah Aerospace Companies

Utah's aerospace industry employs 21,362 workers in 55 companies. Nineteen of these companies employ (or will employ in 1989), more than 100 workers. A ranking of these 19 companies by employment and the increase in employment by company between 1986 and 1989 are shown in Table 1. The aerospace companies with fewer than 100 employees and the principal products of each are shown in Table 2.

The increase in Utah's aerospace employment from 1986 to 1989 has been over 1,900 jobs. This increase reflects both internal growth from existing firms as well as new jobs created by the location of such firms as McDonnell Douglas, SPS Technologies and Lucas Western. Employment projections for each of the major aerospace companies appear in Table 3.

Table 1
Estimated Employment of Utah's
Major Aerospace Companies

Company	1986	1989
Thiokol	6,500	8,150
Hercules	5,000	4,500
Unisys Defense Group	1,800	1,600*
Litton	900	845
Rockwell Collins	675	580
Evans & Sutherland	525*	750*
E-Systems	500	470
Abex	400	550
Williams International	400	375
TRW	325	490
Teleflex	300	350
Parker Hannifin	285	340
Boeing	220	220
Flameco	170	200
Westromix	80	128
Acme Utah Res. and Dev.	80	120
McDonnell Douglas.	--	230
SPS Technologies	--	140
Lucas Western	--	30
Total	18,160	20,068

*Employment estimate includes only employment in production of aerospace products.

Source: Bureau of Economic and Business Research, Graduate School of Business, University of Utah.

Table 2
Aerospace Companies in Utah
(aerospace employment less than 100)
1989

Company	Employment
Aerocor Corp. (aircraft equipment)	12
Alpine Ind. (aircraft equipment)	25
AV-MAT (commercial spare parts)	25
Bemsco (machine shop and parts)	50
Contour Composites (composite structures)	20
EDO Western (composite structures)	60
Elgie Corporation (frame and parts fab.)	15
Excell Industries (equipment)	10
Eyring Research (sfotware)	120*
Fiber Technology (composite structures)	100
Gentry Aerospace (chemical milling)	10
Globesat (satellite design, test and manuf.)	16
Grumman (database management)	4
Intraspace (satellite design, test and manuf.)	15
JTP Radiation, Inc. (antennas for radar)	21
Kitco (pneumatic repair kits)	65
Larson Davis (sound level meters)	35
Lockheed (missile maintenance)	36
Matco Manufacturing (brakes)	6
Northrup (missile maintenance)	9
Omnidata (portable data recorders)	50
Precision Propellors, Inc. (propellors)	2
R Cubed Composites (comp. structures)	10
Ream Tooling (machine work)	25
Satellite Tech. and Res. (sat. receivers)	50
Space Systems Engineering (R&D lab)	50
Tawsco (spare parts)	20
United Internat'l Group, Inc. (consultants)	6
United Precision (parts, engines)	40
Ute Manufacturing (metal fab.)	70
Val's Machine Shop (machine work)	65
Valley Enterprises (aircraft test equip.)	17
Wecco (oxidizing agent for rocket fuel)	70
Wencor West, Inc. (seals, pins, bearings)	80
Westscot Corp. (parts)	10
Winding Technologies (composite structures)	75
Total	1,294

*Fewer than 120 employees engaged in aerospace work.

Source: Bureau of Economic and Business Research, Graduate School of Business, University of Utah.

Table 3
Projected Employment of Utah's
Major Aerospace Companies[a]

Company	1989	1994
Thiokol	8,150	8,150
Hercules	4,500	5,250
Unisys Defense Group	1,600[b]	1,600[b]
Litton	845	1,000
Evans & Sutherland	750[b]	1,250[b]
Rockwell Collins	580	580
Abex	550	550
TRW	490	490
E-Systems	470	750
Williams International	375	750
Teleflex	350	350
Parker Hannifin	340	520
McDonnell Douglas	230	1,500[c]
Boeing	220	220
Flameco	200	200
SPS Technologies	140	225
Westronix	128	250
Acme Utah Res. and Dev.	120	350
Lucas Western	30	200
Total	20,068	24,185

[a]Projections represent the "best-case scenario" for each company.

[b]Employment includes only employment in aerospace products.

[c]Includes plastic operations.

Source: Bureau of Economic and Business Research, Graduate School of Business, University of Utah.

The combined five-year employment projection shows a total employment in 1994 of 24,185, an increase of over 4,100 jobs.

Although precise historical employment data for Utah's aerospace industry are not available, an approximation of the employment history for the major companies in the industry is given below:

Employment Estimates and Projection for Major Aerospace Companies

1957	Beginning of Utah's aerospace industry
1970	6,500 employees
1980	12,000 employees
1989	20,068 employees
1994	24,185 employees

These figures show nearly a doubling of the aerospace jobs in Utah during the 1970s but it appears it will take almost 15 years for employment at the *major* aerospace companies to double again; 12,000 in 1980 to 24,185 by 1994. The projection may be low if both the Peacekeeper and the Midgetman Missile programs are funded--and at high levels--not likely in this period of large budget deficits and growing pressure on the DOD budget. Employment growth could also exceed projected levels if commercial airline companies shift to Hercules' composite structures and filament winding for the fuselage systems of the new generation of commercial aircraft.

Job Survey

An occupational survey of Utah's aerospace companies indicates that machinists and machine operators comprise only about 4 percent of the total labor force, fewer than 700 employees. The average wage range for a journeyman machinist is $12.50 to $13.50 per hour, and for a machine operator $8.00 to $9.00 per hour. Although machinists and machine operators represent a very small percentage of the total aerospace labor force, the shortage of workers in these occupations will probably make it more difficult for Utah to attract skilled manufacturing operations. At this time the state is better suited for semi-skilled operations such as McDonnell Douglas.

The largest production level occupation for the industry in Utah is engineers, with 4,100 employees or 20 percent of the labor force. The starting salary level in Utah for engineers is $28,000 to $30,000, consistent with the national market. The average engineer's salary is between $38,000 and $40,000. None of the firms interviewed complained of serious recruiting problems for engineers. They all view engineers as part of a national market rather than the local labor market.

Future Employment

During the 1980s, employment growth in Utah's aerospace industry increased by about 1,000 jobs a year. The driving force behind this employment growth was the build-up in strategic missile programs and the development of the Space Shuttle. For the state to achieve annual average employment increases above 1,000 employees, NASA and DOD missile and space programs would have to be expanded considerably or Utah must gain major entry into the commercial or military aircraft markets. This would require continued expansion of McDonnell Douglas or the location of a large commercial aircraft facility for Boeing or one of the other major military aircraft manufacturers such as Grumman Aerospace, Northrop, Lockheed or General Dynamics. The location of a major engine manufacturer such as United Technologies, General Electric Company, Teledyne, Textron, or Pratt Whitney, or even the expansion of the missile and space sector with the location of Aerojet, Hughes, LTV or Martin Marietta would also substantially increase employment.

Entry into the commercial and military aircraft sectors or related products and services may be difficult given the low level of development for these sectors in Utah. The "critical mass" of skills and infrastructure have not been developed. Chart 2 shows the structure of Utah's aerospace industry compared to the industry nationally. Utah has more than twice the concentration of activity in the space and missile sector than the national average; but the state has less than half the level of activity in the commercial aircraft, military aircraft and related products and services sectors.

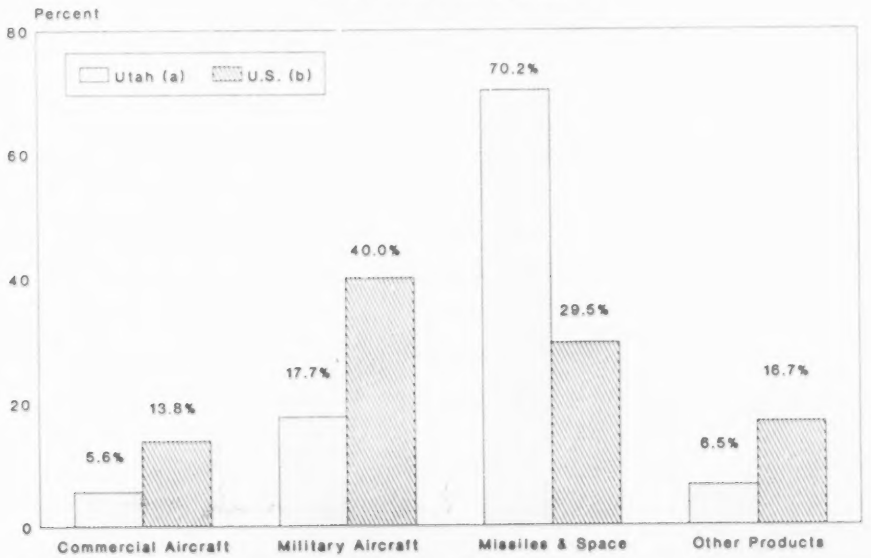
The state's ability to attract additional aerospace companies is, in part, determined by the quality of the labor force. The existing aerospace companies agree that the Utah worker has a very high work ethic; however, skilled manufacturing facilities such as Parker Hannifin and Lucas Western have experienced a shortage of machinists and machine operators. Utah's challenge is to broaden its labor advantage so as to appeal to a greater variety of aerospace firms. Moreover, the development of a skilled labor market will assist firms already in the state to expand.

National Trends and Forecasts for the Aerospace Industry

Total sales for the aerospace industry grew at a 13.2 percent annual rate between 1977 and 1987. The share of military sales has remained fairly constant for this period, accounting for 53 percent of total industry sales in 1977 and 1987. Military aircraft sales have increased at a faster rate than the commercial sector for this period, although forecasts show a slight reversal in the near term. Sales in the space sector have grown at a rate faster that the industry average at 16.4 percent.

The military sector is the largest component of the aerospace industry, as demonstrated by the data in Table 4. As the need to reduce the federal deficit continues to adversely affect military expenditures, some aerospace companies are responding to the

Chart 2
Structure of Aerospace Industry
in Utah and the Nation



Source: Bureau of Economic and Business Research, University of Utah: Aerospace Facts and Figures. 1988-1989. Aerospace Industries Association of America, Inc.

[a] Utah Employment.
[b] U.S. Sales.

shrinking defense budget by switching to the commercial market. Rohr Industries, for example, is developing its commercial aircraft engine production at the expense of its military production in response to government tightening.

The commercial sector continues to benefit from the effects of U.S. airline deregulation and the demand for moderately-sized fuel-efficient aircraft as well as overseas demand for newer versions of larger aircraft for flying longer distances. Recent trends suggest a strengthening in the commercial sector. In 1987, for example, 355 transport aircraft were delivered as compared to 188 in 1986. It should be noted that nearly 50 percent of these deliveries were exports. This is a major reason why the industry posted a positive trade balance in 1987. Boeing and McDonnell Douglas combined for more than 85 percent of the total value of civilian aircraft deliveries. Sales of commercial aircraft are expected to remain strong in the near future.

Another bright spot in the aerospace industry is the aircraft engines and engine parts sector. The strength in this sector is similar to the re-equipment cycle of the early 1980s. In a time of high operating costs and intense competition, airlines have found it necessary to stretch the life of their existing aircraft and the average age of all aircraft is nearing an all-time high. International collaboration in the engine sector is providing a catalyst for sales and is creating an industry which transcends national boundaries. Boeing, General Electric and Pratt-Whitney are the leading domestic suppliers involved in working with foreign counterparts in the development and manufacture of aircraft engines.

A heavy backlog of postponed commercial, military and scientific projects ensures robust growth for the space sector provided the Space Shuttle continues to be successful and the economy avoids a recession. Forecasts for annual growth rates in space-related products and research range from 6.5 percent to 10 percent and above.

If these trends continue, the aerospace industry will experience steady growth in the next several years. More importantly, the industry will avoid a recession. The cyclical volatility of the industry has plagued companies for many decades. If the industry can avoid a downturn, then the aerospace companies will have an opportunity to plan for the future. The severity of the aircraft business cycle has tended to so disturb the planning horizon in the industry that fewer and fewer firms are left to compete in the market. This is especially true in the case of the subcontractor market, which is exceptionally vulnerable to a drop in sales. A continued upswing in the industry will reduce the number of failures in this market and will help keep this market viable.

Summary

Missile and space programs have defined the character and determined the performance of Utah's aerospace industry. In the next decade the success of the industry in Utah will depend on: (1) the ability of local aerospace firms to offset the anticipated decline in missile programs through increased funding for space programs, and (2) state and local economic development efforts to gain major entry for the state into commercial aircraft, military aircraft and related products markets.

Table 4
Aerospace Industry Sales by Product Group
(millions)

Year	Total Sales	Aircraft			Missiles	Space	Related Products & Services
		Total	Commercial	Military			
1977	$32,199	$16,988	$ 6,183	$10,805	$ 4,108	$ 5,001	$ 6,104
1978	37,702	21,074	8,222	12,852	4,098	5,717	6,813
1979	45,420	26,382	13,227	13,155	4,778	6,545	7,713
1980	54,697	31,464	16,285	15,179	6,469	7,945	8,819
1981	63,974	36,062	16,427	19,635	7,640	9,388	10,884
1982	67,756	35,484	10,982	24,502	10,368	10,514	11,390
1983	79,975	42,431	12,373	30,058	10,269	13,946	13,390
1984	83,486	41,905	10,690	31,215	11,335	16,332	13,914
1985	96,571	50,842	13,370	36,572	11,438	18,556	16,095
1986	106,183	56,405	15,718	40,687	11,964	20,117	17,697
1987	112,066	60,290	15,465	44,825	10,195	22,903	18,678

Source: Aerospace Industries Association, 1988.

Utah Business Statistics

UTAH DATA	May 1988	May 1989	% Change from Year Ago	12-Month Average This Year	12-Month Average Last Year	12-Month Average % Change
Total Personal Income (seasonally adjusted) (mil. of dol.) (qtly.)	20,071	NA	NA	NA	19,527	NA
New Corporations (no.)	509	525	3.1%	451	476	-5.3%
New Car, Truck, and Motor Home Sales (no.)	5,975	5,762	-3.6%	5,107	5,266	-3.0%
Agriculture						
Average Prices Recorded by Farmers (dol.)						
Beef Steers and Heifers (cwt) (thous.)	70.70	71.50	1.1%	70.14	65.98	6.3%
Lambs (cwt)	67.00	64.30	-4.0%	60.38	71.08	-15.1%
Milk Wholesale (cwt)	10.80	11.30	4.6%	11.83	11.74	0.7%
Alfalfa Hay, Baled (per ton)	74.00	83.00	12.2%	80.08	71.50	12.0%
Cattle Slaughtered (live weight) (thous. of lbs.)	45,108	48,283	7.0%	47,021	44,558	5.5%
Construction						
Total Construction (thous. of dol.) 1	74,417.4	75,716.6	1.7%	68,623.7	NA	NA
Residential	40,010.3	44,094.4	10.2%	33,732.7	NA	NA
Nonresidential	22,405.7	18,786.7	-16.2%	21,979.4	NA	NA
Additions, Alterations, and Conversions	12,001.4	12,880.4	7.3%	12,915.2	NA	NA
Total Permit Construction (thous. of dol.) 2	81,386.8	78,937.7	-3.0%	73,813.7	78,464.3	-5.9%
Residential	42,774.9	45,873.4	7.2%	35,186.1	35,649.9	-1.3%
Nonresidential	24,267.8	19,975.7	-17.7%	24,794.5	28,886.5	-14.2%
Additions, Alterations, and Repairs	14,344.1	13,088.6	-8.8%	13,833.1	13,928.0	-0.7%
New Dwelling Units (no.)	589	563	-4.4%	470	499	-5.9%
Employment						
Civilian Labor Force (thous.)	744.8	763.9	2.6%	762.7	751.9	1.4%
Total Employed Persons	707.6	728.0	2.9%	728.3	709.3	2.7%
Unemployed Persons	37.2	35.9	-3.5%	34.4	42.5	-19.2%
Percent Total Labor Force	5.0	4.7	-6.0%	4.5	5.7	-20.5%
Employees on Nonagricultural Payrolls (thous. of jobs)	657.7	683.1	3.9%	668.7	646.3	3.5%
Manufacturing	98.2	101.7	3.6%	99.8	95.1	5.0%
Mining	8.6	7.7	-10.5%	8.0	8.3	-2.9%
Contract Construction	25.2	25.3	0.4%	24.7	25.4	-2.4%
Transportation, Communication, and Utilities	38.9	39.5	1.5%	39.8	38.2	4.2%
Wholesale Trade	34.8	37.2	6.9%	35.7	34.8	2.5%
Retail Trade	118.8	124.7	5.0%	122.4	118.5	3.3%
Finance, Insurance, and Real Estate	33.3	33.3	0.0%	33.3	33.7	-1.0%
Services 3	152.8	162.9	6.6%	161.1	150.4	7.1%
Federal Government	39.5	40.7	3.0%	39.6	39.5	0.4%
State Government 4	39.9	41.1	3.0%	38.8	38.1	1.8%
Local Government 4	67.7	69.0	1.9%	65.4	64.3	1.8%
Average Weekly Hours						
Manufacturing	39.8	38.7	-2.8%	40.3	40.1	0.5%
Mining	41.0	39.9	-2.7%	40.8	42.4	-3.7%
Wholesale Trade	37.1	35.0	-5.7%	36.7	38.3	-4.3%
Retail Trade	27.9	27.1	-2.9%	27.7	28.2	-1.8%
Amount of Unemployment Compensation (thous. of dol.)	5,548.0	5,134.3	-7.5%	5,365.3	6,634.5	-19.1%
Finance						
Savings, Savings and Loan Association (mil. of dol.)	2,356.4	2,195.5	-10.6%	2,329.3	2,374.4	-1.9%
Tax Collections by the State of Utah (thous. of dol.)						
Total Tax Collections	253,928.1	247,349.8	-2.6%	149,054.1	146,956.6	1.4%
Sales and Use Tax	130,039.5	136,088.8	4.7%	55,303.3	50,611.0	9.3%
Motor Fuel Tax	10,557.7	10,603.5	0.4%	10,988.3	10,277.6	6.9%
Individual Income Tax	52,130.0	45,765.0	-12.2%	52,320.2	52,110.1	0.4%
Corporation Franchise Tax	6,033.0	2,913.8	-51.7%	7,138.9	5,943.6	20.1%
Production						
Crude Oil to Refineries (thous. of bbls.)	4,297.0	NA	NA	NA	3,874.5	NA
Crude Oil (thous. of bbls.)	2,962.6	2,478.3	-16.3%	2,562.5	2,907.8	-11.9%
Natural Gas (mil. of cu. ft.)	23,908.2	24,104.0	0.8%	23,013.1	22,959.3	0.2%
Coal (thous. short tons)	1,316.0	1,498.0	13.8%	1,475.8	1,498.3	-1.5%
Tourism/Travel						
Air Passengers (total no. on and off)(S.L. Int'l Airport)	806,397	871,611	8.1%	905,088	914,491	-1.0%
Highway Traffic Count Across State Lines	NA	43,017	NA	NA	NA	NA
Transient Room Taxes (thous. of dol.)	1,929.3	1,336.8	-30.7%	546.5	521.4	4.8%
Visits, State, Nat'l. Parks, Monuments (thous.)	1,406.7	1,513.7	7.6%	1,111.2	1,068.1	4.0%
Utilities						
Telephone Lines in Service (Mt. Bell)(Residential)	486,693	497,893	2.3%	492,998	483,443	2.0%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	180,049	185,601	3.1%	183,315	177,894	3.0%
Electric Customers (Residential)	475,395	483,723	1.8%	479,569	475,214	0.9%
Electric Customers (Commercial)	46,649	47,754	2.4%	47,379	46,380	2.2%
Natural Gas Customers (Residential & Commercial)	457,736	471,888	3.1%	464,229	451,639	2.8%
Natural Gas Customers (Industrial)	546	569	4.2%	556	549	1.2%

Utah Business Statistics

UTAH DATA	May 1988	May 1989	% Change from Year Ago	12 Month Average This Year	12-Month Average Last Year	12-Month Average % Change
Davis County						
Non-Ag. Employment (thous.)	52.9r	54.9f	3.8%	53.2	51.9	2.4%
Unemployment Rate	4.5r	4.2	-6.7%	3.9	5.1	-22.5%
Auth. Permit Construction (thous. of dol.)	11,690.9	9,825.5	-16.0%	8,294.2	10,101.6	-17.9%
New Dwelling Units (no.)	98	90	-8.2%	65	78	-16.5%
Postal Receipts (thous. of dol.)	434.3	687.4	58.3%	498.4	375.7	32.6%
Electric Customers (Residential)	47,928	49,097	2.4%	48,453	47,731	1.5%
Electric Customers (Commercial)	3,412	3,602	5.6%	3,565	3,330	7.1%
Natural Gas Customers (Residential)	50,170	51,719	3.1%	51,036	49,422	3.3%
Natural Gas Customers (Industrial)	52	57	9.6%	54	52	3.9%
Telephone Lines in Service (Mt. Bell)(Residential)	55,117	56,802	3.1%	55,958	54,958	1.8%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	11,239	11,881	5.7%	11,613	10,863	6.9%
Salt Lake County						
Non-Ag. Employment (thous.)	340.0r	351.6f	3.4%	344.6	335.1	2.8%
Unemployment Rate	4.5r	4.4	-2.2%	4.1	5.2	-22.6%
Auth. Permit Construction (thous. of dol.)	36,697.5	33,100.5	-9.8%	31,842.3	36,317.1	-12.3%
New Dwelling Units (no.)	225	186	-17.3%	178	181	-1.8%
Postal Receipts (thous. of dol.)	8,490.9	8,457.7	-0.4%	8,301.4	7,554.3	9.9%
Electric Customers (Residential)	238,697	242,876	1.8%	241,248	237,767	1.5%
Electric Customers (Commercial)	20,349	20,858	2.5%	20,641	20,149	2.4%
Natural Gas Customers (Residential)	220,632	224,667	1.8%	222,226	218,506	1.7%
Natural Gas Customers (Industrial)	236	243	3.0%	239	235	1.4%
Telephone Lines in Service (Mt. Bell)(Residential)	229,837	234,257	1.9%	232,051	228,277	1.7%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	110,652	112,343	1.5%	111,751	110,251	1.4%
Utah County						
Non-Ag. Employment (thous.)	78.4r	82.6f	5.4%	80.7	76.9	5.0%
Unemployment Rate	4.3r	3.9	-9.3%	3.7	5.6	-34.2%
Auth. Permit Construction (thous. of dol.)	10,484.4	10,406.3	-0.7%	11,871.3	10,662.7	11.3%
New Dwelling Units (no.)	69	79	14.5%	70	68	2.2%
Postal Receipts (thous. of dol.)	1,178.8	1,368.2	16.1%	1,312.8	989.5	32.7%
Electric Customers (Residential)	52,611	53,843	2.3%	52,716	52,703	0.0%
Electric Customers (Commercial)	5,955	5,958	0.1%	5,995	6,076	-1.3%
Natural Gas Customers (Residential)	61,323	62,964	2.7%	62,281	60,868	2.3%
Natural Gas Customers (Industrial)	66	75	13.6%	71	69	3.2%
Telephone Lines in Service (Mt. Bell)(Residential)	63,620	65,418	2.8%	65,420	63,420	3.2%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	19,817	21,428	8.1%	20,770	19,315	7.5%
Weber County						
Non-Ag. Employment (thous.)	62.4r	65.1f	4.3%	62.4	60.7	2.8%
Unemployment Rate	5.7r	5.1	-10.5%	4.9	6.8	-26.9%
Auth. Permit Construction (thous. of dol.)	4,867.5	6,096.2	25.2%	5,340.0	7,420.1	-28.0%
New Dwelling Units (no.)	44	62	40.9%	46	58	-21.0%
Postal Receipts (thous. of dol.)	682.1	659.5	-3.3%	684.4	630.6	8.5%
Electric Customers (Residential)	53,412	54,228	1.5%	53,846	53,159	1.3%
Electric Customers (Commercial)	4,898	5,051	3.1%	4,975	4,889	1.8%
Natural Gas Customers (Residential)	49,680	50,611	1.9%	50,156	49,242	1.9%
Natural Gas Customers (Industrial)	82	85	3.7%	84	84	-1.1%
Telephone Lines in Service (Mt. Bell)(Residential)	46,473	47,345	1.9%	46,868	46,116	1.6%
Telephone Lines in Service (Mt. Bell)(Nonresidential)	11,881	12,246	3.1%	12,105	11,357	6.6%

1 Obtained from U.S. Bureau of the Census Construction Statistics Division.
2 Obtained from *Utah Construction Report*.
3 Includes services by nonprofit and religious organizations.
4 Includes public schools and college institutions.

NA Not Available
r Revised
f Forecast

Sources:

Personal Income	U.S. Department of Commerce, Bureau of Economic Analysis.
New Corporations	Utah Secretary of State.
New Car and Truck Sales	Utah State Tax Commission, Economic and Statistical Unit.
Agriculture	U.S. Department of Agriculture, Utah Agricultural Statistics Service, *Utah Agriculture*.
Construction Data	U.S. Bureau of the Census and Bureau of Economic and Business Research, *Utah Construction Report*.
Employment Data	Utah Department of Employment Security.
Savings Information	Utah Savings and Loan Institutions.
Tax Collections	Utah State Tax Commission.
Crude Oil Production	Area Oil Refineries.
Natural Gas Production	Utah Department of Oil, Gas, and Mining.
Coal Production	U.S. Department of Energy.
Air Passengers	Salt Lake City International Airport, Statistics Division.
Highway Traffic Count	Utah Department of Transportation.
Visits to State and National Parks and Monuments	U.S. Forest Service, Utah State Parks and Recreation Department.
Utilities Data	Cooperating Utah Utility Companies.
Postal Receipts	Postmasters in Davis, Salt Lake, Utah, and Weber Counties.

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NATIONAL DATA	May 1988	May 1989	% Change from Year Ago	12-Month Average This Yea.	12-Month Average Last Year	12-Month Average % Change
U.S. Gross National Product (seasonally adjusted) (bil.) (qtly.)	4,838.5	5,206.6	7.5%	5,034.8	4,672.5	7.8%
Total Personal Income (seasonally adjusted) (bil. of dol.)	4,023.3	4,395.7	9.3%	4,219.5	3,894.5	8.3%
Industrial Production Indexes (seasonally adjusted) (1977=100)	136.1	141.6	4.0%	139.7	133.0	5.0%
Total Non-Farm Bus. Expend. on New Plants & Equip. (bil.) (qtly.)	426.9	467.5	9.5%	447.8	406.2	10.2%
Net Exports of Goods and Services (bil.) (qtly.)	-74.9	-52.7	-29.6%	-62.8	-100.2	-37.3%
Exports of Goods and Services (bil.) (qtly.)	532.5	623.2	17.0%	583.8	490.8	19.0%
Imports of Goods and Services (bil.) (qtly.)	607.5	675.9	11.3%	646.6	591.0	9.4%
Index of Leading Indicators (1982=100)	141.5	143.7	1.6%	144.4	140.8	2.6%
Price Indexes						
Consumer Price Indexes (not seasonally adjusted) (1982-84=100)						
CPI-U (All Urban Consumers) All Items	117.5	123.8	5.4%	120.7	115.5	4.5%
CPI-U (All Urban Consumers) Food & Beverages	117.1	124.7	6.5%	121.1	115.0	5.3%
CPI-U (All Urban Consumers) Housing	117.7	122.1	3.7%	120.3	116.0	3.7%
CPI-U (All Urban Consumers) Transportation	108.1	116.0	7.3%	111.2	106.9	4.0%
CPI-U (All Urban Consumers) Medical Care	137.5	147.5	7.3%	142.7	133.5	6.9%
CPI-U (All Urban Consumers) Energy	88.7	97.4	9.8%	91.2	89.1	2.1%
Producer Price Index (not seasonally adjusted) (1982=100)						
Producer Price Index, All Finished Goods	107.5	114.2	6.2%	110.4	106.2	4.0%
GNP Price Deflator (1982=100) (qtly.)	120.6	125.9	4.4%	123.5	118.8	3.9%
Civilian Employment (seasonally adjusted)						
Total Civilian Labor Force (mil.)	121.2	123.6	2.0%	122.6	120.6	1.7%
Total Civilian Employment (mil.)	114.4	117.2	2.4%	116.1	113.6	2.2%
Unemployment Rate	5.6	5.2	-7.1%	5.3	5.6	-9.0%
Construction						
Total Construction (mil. of dol.)	24,137.5	23,796.5	-1.4%	20,463.4	21,570.6	-5.1%
Residential	11,686.1	11,388.7	-2.5%	9,878.1	9,995.6	-1.2%
Nonresidential	7,254.1	7,959.3	9.7%	6,985.7	7,617.1	-8.3%
Non-Building	5,197.3	4,448.5	-14.4%	3,599.6	3,980.4	-9.6%
New Dwelling Units (no.)	138,454	130,624	-5.7%	115,900	125,806	-7.9%
Interest Rates						
Federal Funds Rate	7.09	9.81	38.4%	8.74	6.83	27.9%
Short Term (3-month Treasury bill rate)	6.27	8.40	34.0%	7.77	5.94	30.9%
Long Term (30-year Treasury bond yields)	9.24	8.95	-3.1%	9.12	8.97	1.7%
Prime Rates Charged by Banks on Short-term Business Loans (avg.)	8.84	11.50	30.1%	10.38	8.60	20.8%
Mortgage Rates (new homes)	8.59	9.82	14.3%	9.18	8.86	3.6%

Sources: *Business Conditions Digest*, U.S. Department of Commerce: U.S. Gross National Product, Total National Personal Income, Industrial Production Indexes, Total Business Expenditures for New Plant Equipment, Export/Import Data, Index of Leading Indicators, GNP Price Deflator, National Employment Data, Interest Rates.

F.W. Dodge Report, McGraw-Hill: National Construction Data.

Survey of Current Business, U.S. Department of Commerce: New Home Mortgage Rates.

Utah Labor Market Report, Utah Department of Employment Security: Consumer Price Indexes, Producer Price Index.

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